switching the visual display provided by the phone between the built-in display **14** and the optical projector **16**. The ON/OFF switch is not necessary to the implementation of the present invention. In such a case, the phone provides the same display information to both the built-in display **14** and the optical projector **16** and the user determines which display output to view.

The phone **20** may also optionally include a mouse pad **13** for receiving user input. The user input may be provided to navigate through a document, select portions of a document, or manipulate a document or other image being displayed on the external display surface **17**.

The phone **20** may also be provided with a focus dial **15** for adjusting the image displayed on the external display surface **17**.

The internal components of phone **20** will now be described by way of reference to FIG. **2** which is a block diagram illustration of the internal components of cellular phone **20**. Referring now to FIG. **20**, cellular phone **20** includes an antenna **1**, radio frequency receiver **2** and microcontroller **3**, as is conventional and well known in the art. The cellular phone **20** also includes a transmit section (not shown) for processing and transmitting information as is well known in the art. In the receive direction, radio frequency signals are received via antenna **1**, demodulated by receiver **2** and then input as receive data to microcontroller **3** for subsequent processing and handling. The receive data may include audio information which is processed and handled in a conventional manner, as is well known in the art, and, therefore, will not be discussed further herein.

The receive data, which may also include text, graphics, or video, may be stored in buffer memory **4** and then provided to display controller **5**. Display controller **5** is controlled by microcontroller **3** and operates to format the receive data stored in buffer memory **4** and to provide the properly formatted data to display driver **6** for subsequent display. When the phone **20** is operating in conventional display mode, i.e., ON/OFF switch **12** is set to OFF, LCD screen **7** is activated and the display driver **6** operates to display the received data on LCD screen **7**. LCD screen **7** may be any of a number of commonly used built-in displays for cellular phones or other mobile devices. While the buffer memory **4** and display controller **5** are illustrated as separate components, it should be understood that one or more of these components may be integrated with microcontroller **3**, depending on the particular physical implementation of the circuitry illustrated in FIG. **2**.

Display controller **5** controls the display driver **6**, which, for example may be controller #1766 or #1767 available from Seiko Instruments, for row and column displays respectively. Display controller **5** takes into account the display format required by the specific electronic display on the cellular phone. Display controller **5** has access to the buffer memory **4** where display information is held and takes this data out of the buffer memory **4**, row by row and sends one row of data at a time to the display driver **6**. These rows are updated one line at a time to provide a 70 Hz update rate for the entire display frame. Of course, any similar manner of displaying information may be used in accordance with the present invention.

When the phone **20** is operating in projector display mode, LCD screen **7** is optionally disabled, and optical projector display system **8** is enabled. In this mode, display driver **6** operates to display the received data via optical projector display system **8**, and optionally via LCD screen **7**, as well. The optical projector display system is illustrated in further detail in FIG. **3** and includes a high intensity bulb **10**, such as a HID (high intensity discharge) xenon bulb available from Welch Allyn (Skaneateles Falls, N.Y.). The light output from the bulb **10** is passed through a collimating lens **18** which evenly distributes the light. According to one embodiment of the present invention, the collimated light is then passed through a transmissive LCD display **11** which is configured by the display driver **6** to display the particular image to be displayed on the external surface. Next, after the display **11**, there is placed a focusing lens **19** which can be either automatically operated (auto-focus) or adjusted by the user by way of focus dial. The transmissive LCD display **11** may have an active viewing area as small as a fraction of an inch on a side, up to one inch on a side or more. In one embodiment of the present invention, the display **11** may be of the polysilicon active matrix transmissive display type, and may, for example, be a 1.3" LCD display, part number LCX031ALT available from Sony Corporation.

In an alternative embodiment according to the present invention, the xenon light source **10** and collimating lens **18** may be directed so as to reflect light off of the LCD display **11** to cause the projected image to be displayed on the external surface. According to this embodiment, the LCD display **11** is not a transmissive display, but rather a reflective display in which one side of the display **11** is coated with a mirror-like finish or other reflective surface.

The display **11** may either be monochromatic or color. In the case of a color display, a single display with three built-in color filters may be used. Alternatively, three separate displays, each one having a single color filter may be used, and then the output of the three displays combined into a composite color picture using appropriate optics, as is well known in the art.

In accordance with the present invention, a user is able to view information received by way of a cellular phone or other mobile device, by projecting the information display onto an external surface. In this way, the projected image may be made significantly larger than the image area of a conventional built-in display of the cellular phone. Similarly, the projection of information may be used in connection with the transmission of information, such as is the case, when the user is using the mobile device to compose or transmit a document or some other information. When viewing the displayed information on the external viewing surface, the user is also able to use mouse pad **13** to navigate through the displayed document or information, as well as to select or manipulate portions of or the entire document being displayed.

While the invention has been particularly shown and described with reference to preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention.

What is claimed is:

1. A hand held wireless mobile device for displaying received information, comprising:

a display controller operable to format the received information in a first format comprising a plurality of small pages derived from each single original page, and a second format comprising a plurality of original page format pages;

a built-in display operable to receive the first format information and display one at a time, each of the small pages derived from said original page; and

an optical projector display system, independent of said built-in display, for displaying the second format infor-